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THE SCIENCE OF MUSIC

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PUBLISHERS' NOTE

THAT we have been able to present this research publication from the pen of Sri K. Vasudeva Sastri, a veteran Research Scholar is a happy coincidence when experts in Fine Arts from the corners of the world are on pilgrimage to India to study the best in every aspect of Fine Art.

Of the cultural treasures of the East, Music fascinates most of the experts of the East and of the West, giving food for imagination, scope for appreciation, and field for research. 'Raga', the unique feature of Indian Music and its appeal to emotion has captured the minds and hearts of the Art Pilgrims to Bharat. When one thinks of unravelling the secret of the endless variety, subtlety and withal, the clearest emotional appeal of Indian Music, the very thought of it leads him to a world of deep research. The principles of Indian music will then be found to be the principles of every other system of music. It is the grammar of music in general that is found in greater clearness in Indian Music. Our long-cherished desire to publish a book that will help to solve all problems relating to Music is thus fulfilled by this publication.

We dedicate this book to all those who are interested in music, from the lover of the art to the expert in it, and leave it to them to judge its merits.

25-11-1954 THE PUBLISHERS.

PREFACE

THE present publication contains the results of my search among our ancient texts for discovering the fundamental concepts that go to build up a Raga, the unique feature of Indian Music. The more I understood these concepts and appreciated their rationale, the more I felt that the rules of the Divine Art contained in our texts are of Universal Application to all systems of the world. I have therefore thought it necessary to present my researches not only in Tamil which I have done already in great detail, but also in English so that all students of the Art in India and elsewhere may feel the joy that I have felt when the rationale of the rules of practice were discovered in the texts. These rules that differ from one system of music to another and appear arbitrary, will, when their rationale is understood shed their apparent arbitrary character and acquire a higher status as 'Laws of the Science of Music' in general.

The stresses, and the ebbs and flows that now occur in practice will then be realized in all their importance and will add more life to the Art while at the same time it lends a sureness of touch to the Artists.

I hope and pray that this humble service of mine to the Divine Art will bear fruit as it ought to.

Tanjore.
31-12-1954.

K. VASUDEVA SASTRI.

CHAPTER I

Music - its variety and universality

It is rarely that a North Indian audience is able to enjoy Carnatic Music, and rarer still does an Indian audience appreciate European music. If we analyse musical pieces into the 'swaras' (notes) that compose them, we find that the main pitches that go to make up the different systems of music are practically the same. The 'notes' of the Diatonic Scale in European music are the same as those of the 'Śuddh' swaras of Hindustani Music and they are the same as the 'Sankarābharaṇa Mela' of Carnatic Music. But all the same, a piece in the Diatonic Scale sounds entirely strange to an Indian ear, and the Sankarābharaṇa Rāga sounds as strange to a North Indian.

What then is the cause of this difference? The Carnatic musician satisfies himself by stating that, in the Hindustani system they freely admit notes foreign to the 'Ṭhāṭ' while on the other hand they themselves are more careful in avoiding swaras not pertaining to the 'Mēla'. It is true that stranger notes are admitted in the Hindustani system; but it is equally true that the same practice is observed in the Carnatic system as well, in many of the Rāgas. The fact is that the reason for the difference can be found only by a deeper analysis of the *notes* that are apparently similar in the several systems of music.

A first step in such an investigation will be to find out if a difference is recognisable when the apparently similar notes are played each by itself on the same instrument by the musicians of the different schools.

Let three musicians each belonging to one of the three systems Carnatic, Hindustani and European be placed behind a screen, and let them play on the same instrument, say violin, the notes of the 'Diatonic Scale, in order. Let them play the notes as a mere sequence as in their first lesson without adding any of the graces that are usually found in musical compositions. Even then, you will be able to recognise who is the Carnatic musician, who the Hindustani and who the European. It is clear, therefore, that there is something peculiarly characteristic of the systems.

We therefore, have to suspect that although a note say 'C' in European music which corresponds to 'Sa' in Indian, is produced in the same pitch as 'Sa', still the way in which 'C' is pronounced in the European system is essentially different from the way in which 'Sa' is pronounced in the Carnatic system, which is again different from the way in which 'Sa' is pronounced in Hindustani system. A keen ear will be able to observe that the Carnatic musician begins at a lower pitch in his effort to pronounce the note, and goes up and stays in the main pitch of the note. His pronunciation of the 'Sa' is very much like the sounding of two successive notes, namely, 'Ni' the lower note and 'Sa' the main note. We hear in fact a sound like 'NiSa'. Musicians sometimes call the subsidiary note that helps in the pronunciation,

'anuswara'. In the same way, it will be observed that the Hindustani musician begins his pronunciation of 'Sa' in a slightly higher pitch, descends down to the main pitch and stays in it. His pronunciation of 'Sa' is very much like two successive notes namely the higher note 'Ri' and the main note 'Sa'. We hear in fact a sound like 'Ri Sa'. The European note is more full-blown than either the Carnatic or the Hindustani note. It seems to begin in a lower pitch, go up, pass the main pitch, reach a higher pitch and come round to the main pitch. His pronunciation of 'C' (*dō*) sounds very much like a succession of three notes namely 'B' (*Se*) the lower note, then 'D' (*Re*) the higher note and then 'C' (*dō*) the main note; we hear in fact a sound like 'Se Re Do'. This characteristic mode of pronunciation generally applies to all the notes in each system. In particular pieces, of course, the graces might vary the mode. Therefore the difference between the several systems lies in the very pronunciation of the notes, though they are apparently similar. In fact *it is impossible to reduce one system of music to the notation of another system, because the notation of the each system carries with it the pronunciation characteristic of the system although it is not expressed.* It is therefore, necessary for any musician who wants to learn another system of music, to go through a regular course beginning with a firm foundation in the first lessons dealing with the pronunciation of the notes.

INDIAN TEXTS ON THE SUBJECT

This difference in pronunciation is scientifically dealt with in the Indian texts on music. It is not as

well known as it ought to be that in our country the earliest texts on almost every Art and Science are contained in big volumes written by Maharishis and that the older the books, the fuller and deeper is the treatment of the subject. Some of these texts have been lost, but those relating to Music are fortunately available though their study has been neglected. In these texts, *a note is said to be composed of more pitches than one although each note has a main pitch where it stays longest.* The simple '*pitch*' has a different name from a '*note.*' A pitch is called a '*sruti*' and a note is called a '*Swara*'. There are swaras of two srutis, swaras of three srutis and swaras of four srutis also, *though all of them may have the same main sruti where they stay longest.* These are exemplified in the flute. When the full hole is left open you get a swara of four srutis and when half the hole is closed, you get a swara of 2 srutis though the main sruti of the both may be the same. In the same way a swara of three srutis is produced by alternately opening and closing the hole. The composition of notes is thus more complex than is imagined and their pronunciation is capable of endless variety giving rise to the several systems of music in the world.

THE SEVEN MODES OF PRONUNCIATION

The different methods of pronunciation have also been scientifically analysed in our texts. There are seven types of pronunciation of each note each of which is clearly described. These seven modes that stamp the several systems of music, as well as

the more important question as to why a particular system does not appeal to a listener accustomed to a different system will be discussed in the next chapter.

CHAPTER II

MUSIC - ITS DIVINITY

MUSIC has a wonderful variety of form giving rise to several systems in different climes, each appealing to those accustomed to it. But all the different systems have this one feature in common that each system in its best form is capable of transporting the listener accustomed to it to self-forgetful joy.

We saw the secret of the variety. Let us try if we can solve the mystery of this divine power of music, to yield unalloyed pleasure to sorrowing man. The fact that several systems, each with a different form have this rare power leads us to suspect that there must be an ideal pattern of music of which the several systems are imperfect proto-types. A formal investigation of the invariable capacity of music to give pleasure must begin with the fundamentals of the psychology of pleasure.

PLEASURE AND ITS SOURCE

Pleasure is felt when we get what is desired or desirable. So long as the mind is not dwelling on such an object the mind moves from one unattained object to another making it impossible to feel the

pleasure that arises out of peaceful enjoyment. Now the question is, when we enjoy an object where does the pleasure come from? Is it in the object or in the mind or somewhere else? A moment's reflection is enough to conclude that neither the object nor the mind can be said to be an invariable source of pleasure. The same object that gives us the most thrilling joy at one moment is loathsome at another moment. The mind again is capable of as much enjoyment of pleasure as it is of suffering pain. If neither the mind nor the object is the real source of pleasure, we must look for it somewhere else. Our unaided intellect has helped us to come to a negative conclusion, but is unable to lead us to give a positive answer regarding the source of pleasure.

We shall see if the recorded experience of Seers will help us to give a positive answer. Such records are only too plentiful in our country. These are what we call the 'Vedas' of which the 'Upanishads' form the last portion and are therefore called by the name 'Vedanta'. These latter deal exclusively with the question whether it is possible for man to be always free from the everchanging pendulum of pleasure and pain and attain a state of permanent happiness for which we strive unconsciously by every one of our acts. These records emphatically give an answer in the affirmative to the question now stated. Nay, it says more, something more wonderful indeed than the most staggering truth that was ever told. They say happiness is your birthright, pleasure and joy and bliss are the very essence of your being. You deny

yourself this birthright when you forget your real self and imagine that your body or your mind or your senses or a combination of some of these is your self. The truth is, these former are the adjuncts, the creation of your Self. They are the garbs, the self puts on, but soon forgets that they are only garbs; and forgetting its real nature, the self forgets its own blissful state, weeps with the mind, feels pain with the body, longs for an object with the senses. The result is sorrow, which of course is borrowed.

Pleasure is thus the inalienable quality of self, but plays hide and seek with itself. The question is, 'How does music help us to regain this, our lost inheritance?'

The self is present in the heart of every living being and manifests its quality to a smaller or greater extent in different species of creation. It is least in plants and gradually increases in animals reaching its maximum in men and super-human beings. In the same way the qualities of self are manifested in different degrees in different forms of inanimate creation.

'ANĀHATA NĀDA'

From the self was directly born the element cognised by the ear and this is called 'Ākāśa'. From 'Ākāśa' the grosser elements are born successively, namely 'Vāyu', which can be heard and felt by the sense of touch; then 'Tējas', which can be seen, felt and heard; and from that, 'Ap' which can be tasted, seen, felt and heard; and from 'Ap' is born 'Pṛthivi'

which is amenable to all our five senses. This being the order of creation, the bliss of self is felt most in 'Ākāśa' which has the quality of sound, and decreases in the grosser elements. In pure Ākāśa unmixed with the grosser elements one must be able to feel the bliss of self in all the maximum possible. Such a pure 'Ākāśa' is present in the heart of every living being; and there is an unstruck music which is called 'Anahata Nada', that is ever heard in that still small space, although our mind which is distracted by outside objects does not stop to listen to it. By practice of concentration it is possible to hear this unstruck music and feel the bliss of it which is sweeter than any other earthly experience. This is given only to the yogis who can be found one in the million or even rarer still. But God in his bounty has blessed living creation with a means of enjoying the bliss of this unstruck music without yogic concentration. This is Music.

MUSIC AND ANĀHATA NĀDA

How does music help us to enjoy the bliss of 'Anahata Nada'? The process is akin to the phenomenon known as 'resonance' in modern science. If two strings are tuned to the same pitch, and if one of them is sounded, the second string also begins to sound, and they both increase each other's volume.

In the same way it must be possible with the help of similar sounds to increase the volume of 'Anāhata Nada' and make it capable of being heard without the aid of yogic concentration. The man who sings for his own pleasure adjusts his voice so as to

produce sounds similar to those of 'Anāhata Nada' and thus hears the latter and enjoys the pleasure inseparable from it. Music thus helps us to enjoy the bliss of self which is ever inseparable from the still small music of the heart. To realize the bliss of self is to realize the Divinity in the self. It is therefore clear that music helps us in the realization of God within us.

MUSIC DEFINED

Music therefore can be defined as the succession of sounds which more or less resembles in quality, the unstruck music of the heart or 'Anāhata Nada' and enables us by the resonance it creates, to hear that unstruck music and experience the joy which is inseparable from it. That is why a particular succession of sounds alone is able to give us joy and not others. The more closely the music of the musician resembles the music of the heart, the more effective will it be in rousing the joy in his own heart and in the hearts of those living beings who hear it. We use the word 'living beings' advisedly because the self resides in the heart of every living being, and that music which is a perfect pattern of Anāhata must be able to rouse the joy in the dullest of creatures.

EACH SYSTEM, AN APPROXIMATION

Every system of music can at best be only an approximation to the perfect pattern which can move all men at all times and places, nay all living beings with a heart to feel. Each approximation must differ in degree and in kind from every other. The music that we hear only helps us to remind us of the perfect

pattern that is ever playing in our hearts. *One who is accustomed to a particular kind of approximation cannot easily acquire the capacity of making use of another kind for reminding himself of the perfect pattern. That is why the Indian music appeals more easily to Indian and the European music to European ear.* Each of them as we commonly have it, is of course a good distance removed from the ideal music, but every listener regards the system to which he is accustomed as the perfect one. The man who is accustomed to the use of the photograph for recognising the originals finds it more difficult to use a picture drawn in lines and vice versa. The more nearly a musician of a particular system approches the ideal pattern the more easily will he appeal to a foreigner.

The next question is, ‘ Is it possible to construct the ideal pattern itself ’? in other words, ‘ what are the fundamental principles that universally apply to all systems of music?’ The answer is given in the most unequivocal manner by our texts of music. They will be dealt with seriatim in the next following chapters.

CHAPTER III

THE UNIVERSAL SCIENCE OF MUSIC

ALL the systems of music are approximations to the music of the soul ever resounding in the heart of every living being. The closer the approximation. the more successful is its resonance in increasing the

volume of the music of the heart and make it amenable to every ear. Music is thus an approach to the Divinity in man and musical pleasure to the Divine bliss of self. This is what we saw in the last chapter.

THE GROPING HAND

It is easily understood how by an empirical adjustment of the voice it is possible to catch the accidental resonance of music of the heart and produce enjoyable music. But the process is like the groping of the blind man who depends for finding his way to a series of lucky accidents. The various systems of music and the rules coined by their practitioners are but the combined results of these gropings.

THE SEER'S VISION

The seer on the other hand who has practiced concentration can hear the cordiac music and analyse it to its basic principles. Such seers have lived in our country; and the most ancient texts of music contain the most detailed analysis of sounds that give maximum enjoyment,—in other words, the basic principles of melody and its varied forms.

Yogic process of seeing through any object is called 'Dharana' or 'carrying the thing in all the fullness of the mental perception'. In the highest form of the 'Dharana' the mind becomes the thing itself and gets a hundred percent experience of the truth of the thing. This has been the process by which our seers have seen the different aspects of the world. So is their study of music.

THE SCIENCE PROPER:

1. SRUTIS' OR SIMPLE PITCHES

From the texts on music, we find that simple sounds of different pitches have been studied in the first instance. It must be borne in mind that the study of sounds and of musical sounds in particular is *not a physical analysis but a physico—physiological, if not physico—physiological —psychological—cum spiritual study*. Sound is defind even in modern text-books of music as a 'sensation.' So it is a physiological fact. No amount of experiments with monochord and Kundt's tube and tuning fork without directing the attention to the emotional and enjoyable aspect of sound will take us even to the shores of the vast and fathomless ocean of music. This is where the western physicist errs in his approach to the study of musical sounds. Music is *first and foremost subjective* and very little part of it is objective. Unless the subjective aspect of music is fully analysed, the objective demonstration of it can serve no useful purpose.

In studying sounds of different pitches, therefore, the line of approach has to be with reference to a normal basic as a point of reference and the range of investigation has to include as the main thing the emotional appeal of those pitches.

'ŚRUTIS' ARE SEPARATELY-HEARD PITCHES

It was first discovered that separate pitches cannot be heard separately unless they have a minimum interval. If the interval were smaller than this minimum, the result would be a conjunction of both the pitches to form 'beats'. It was further

discovered that if we count the successive pitches that have this minimum interval we get only 22 such pitches in any octave. These 22 simple pitches in an octave were given a technical name. They were called 'Śrutis'. The octave, it must be remembered, was always taken with reference to a normal basic to which the mind of the investigating student was rivetted. This rivetting of the mind was given a technical name also. It was called 'Avadhāna' or 'attention'. There is fuller 'Avadhāna' when a man sings than when he talks. Beginning with the basic, it was next discovered, that each of the 22 pitches or Śrutis in an octave has a different emotional appeal and they were given names indicative of that emotion. These 22 were then grouped according to the quality of the emotion under five heads. They are: 'Deepta' (sharp), 'Āyata' (elongated), 'Karuna' (plaintive), 'Mridu' (soft), and 'Madhya' (Middling).

2. COMPOSITION OF SWARAS (NOTES)

The next investigation related to the structure of a note or swara. It was first recognised that a note or swara, if it should have the inalienable quality of being enjoyable by itself, must paratake of the wavy flow of the sound of a bell or of a sounding string. A note or swara therefore is in its structure not uniform either in volume or in pitch throughout its length. It is necessarily composite and complex. And as we saw already, it is capable of a variety of pronunciation giving rise to different systems of music.

It was found that between a basic note and its octave there were eight notes including them, and that they divided themselves into two halves of four notes

each. The first four rose with the same gradation as the second four. It was discovered also that the basic note was more fullsome than the next two succeeding notes which were gradually thinner in composition. The discovery was made that the basic note had in its composition the first four pitches of the octave, the next note, the next three pitches and the third note, the next two pitches. The fourth note which was found to have closer kinship with the basic note than the other two was found to be as fullsome as the basic one and to compose in itself the next four pitches in order. In other words, the basic and the fourth were discovered to be full tones and the second and the third, a minor tone and a semi-tone. The four notes, it must be noted, do not correspond to the first four notes of the 'Diatonic Scale' or the first four notes of the modern 'Suddha Scale' of the Hindustani system. In fact these two appear to be later developments to suit provincial tastes. The second and third note in the most natural form are lower in pitch than the second and third note in the Diatonic or the Suddha Scale. Similar is the composition of the second set of four notes in the octave, namely, four, three, two and four pitches respectively.

It will be seen that the statements, that a note is not a simple pitch and that they are composed of two or more pitches, is not found in clear terms in any of the modern text books of our country or in the west. In the west, a concept called interval has usurped the place of some of the pitches composing the note and diverted the attention of the student from the entire

composition of the note to the main pitch of it in which we stay longest. In fact, a note is taken to be just the same as a simple pitch. The distinction between a swara and a sruti as we have it in the ancient texts of our country has been ignored. That the ebb and flow are inseparable parts of an enjoyable note was forgotton and the full length of the note was taken to be made up of an interval and a pitch, the initial pitches being ignored and reduced to a silent interval in the analysis.

So far the concepts of sruti and swara which are the foundations of music have been explained as laid down in our ancient texts. The secret of molody and the emotional appeal of notes and their combination will be dealt with hereafter.

CHAPTER IV

MUSIC: ITS DUALITY

THE title of this chapter will naturally provoke the question, are there two kinds of Music?

'Yes' is the answer. How do they differ? Are they of different climes or countries? No, they are more fundamentally different than of different climes or countries.

DEFINITIONS OF 'SWARA' AND 'ŚRUTI'

The bricks and concrete blocks of which the musical mansion is constructed are called Śrutis and Swaras. What exactly they are, have been indicated

in outline in the last chapter. The Swaras were described as composite and complex and possessed of the ebb and flow of the sound of a bell or of a string. They have one further quality which constitutes their very life; and that is, *that each swara is enjoyable when pronounced by itself*. If these three conditions are satisfied, then you get a Swara. It is well that the reader is familiarised with the exact description of the original texts where the deepest truths are enshrined. A Swara is defined as follows :-

A resonating sound that is formed of Śrutis without intervals, that has the property by itself of affording pleasure to the mind of the hearer is a Swara. In this definition, the word 'Śruti' occurs and a continuous series of them is said to constitute a Swara. 'Is there no definition of the word Śruti'? it may be asked. Yes, there is. A Sruti is defined thus: "*The first sound from the act of listening which is heard for a short duration and which can be defined as a part of a Swara is a Śruti*". This definition is rather strange. Is it not enough to say that a Śruti is a sound of short duration? why should it be added that it is the "first from the act of listening"? And what does this curious phrase mean— "the first from the act of listening". When you hear a sound lasting, say, half a second, a number of Srutis must constitute that continuous sound. But the perception of each of these Śrutis as separate entities is possible only if a fresh effort at hearing is made for each of them. If the act of listening is continuous, there will be a perception of only the initial Sruti and a continuous sound following it without any perception of individual srutis. So much for an exact idea of the two concepts Sruti and Swara.

ORGANIC GROUPS OF SWARAS

Now we are entering a new world in the next concept. It is the formation of an organic group of Swaras. A group of the seven Swaras is easily understood. Then why this mention of a 'new world' and 'an organic group'? The subject is rather deep as will be seen in the sequel.

When any singer pronounces the seven swaras one after the other, it will be noted that each of the succeeding swaras is formed with reference to the basic 'Sa' usually. You may as well say that the six succeeding swaras have each an organic relationship to the basic 'Sa'. In short you may very well go to the length of saying that the six succeeding swaras are born from the 'Sa'.

THE TWO POSSIBLE BASICS, Sa and Ma

Now, if this were the only possible way of generating swaras, that is to say, if the basic 'Sa' were the only swara from which a series of swaras can be formed, there will be no necessity for this discussion at all. But it has been discovered that you can form from 'Ma' as the basic, the six succeeding swaras, Pa, Dha, Ni, Sa, Ri and Ga, each of which is formed with a fixed relation to 'Ma' as the basic. In other words you can have another organic group with 'Ma' as the basic or generating swara. An easy way to realize the existence of two organic groups with 'Sa' and 'Ma' as their mothers is to recollect the fact that some songs are well enjoyed with 'Sa' as the drone ('Śruti' of the South and 'Sur' of the North) and certain other songs are well

enjoyed with 'Madhyama' as the drone, (i. e.) with 'Madhyama Sruti' as we call it in the South. The fact is that these two organic groups of swaras which have been discovered in our country long long ago, were both being regularly practised by all musicians till about the eleventh and twelfth century. The dark age of a century or more that followed, irretrievably broke the continuity of tradition, and with it, the whole structure of the science of music. The subsequent revival of our arts and sciences which took place in the fifteenth century and later, had to manufacture make-shift rules to preserve the ragas that survived in practice. The swaras composing the ragas were determined with the help of the veena, and the constituent swaras of all the ragas were named with 'Sa' as the basic swara. But in reality there were some ragas formed by the 'Ma' group of swaras and some others with 'Sa' group. There were also ragas which contained a mixture of both the groups.

THE GRAMAS

Books written till about twelve hundred A. D., however, describe in detail these two organic groups of swaras under the concept "*Grāma*" (an organic group). It is clearly stated that there are two Gramas of swaras, namely, 'Shadjagrāma' and 'Madhyama grāma' swaras. There are rāgas known as 'Shadjagrāma rāgas' and others 'Madhyamagrāma ragas.' The former require 'Sa' as its drone for full enjoyment and the latter Madhyama. That is why two tanpuras are used even now in North Indian practice. In the South a single tanpura is made to

serve both the Gramas, the 'Madhyamagrama' being improvised by leaving off a string. We have even now many madhyama grama ragas in practice but without the proper nomenclature of the swaras. In fact these two sets of ragas have different emotional appeals, the Madhyamagrama ragas being softer and more effeminate. This is the duality of music we referred to at the outset.

CHAPTER V

MUSIC: ITS MODES

We in India understand the concept in music called 'Rāga'. But however much we may explain the implications of the term to a European, he finds it almost impossible to understand it as clearly as we do. To put it from the layman's point of view we have Rāgas in India, but none in Europe. Instead of that we have what are known as 'Scales' in the European system. It will be our next step to understand these two concepts and discover the basic principles underlying them.

Although we all know what 'Rāgas' are, although we can distinguish them to a very minute degree and develope particular ragas with faithful accuracy, yet we find ourselves at see when we begin to analyse the constituents of the peculiar 'chhāya' or 'shade' which goes to make up the Rāga; nor do we find it easy to explain scientifically how we maintain the unity of shade when we expand a raga, though we successfully do it.

The Carnatic musician will swear that the particular notes normal, sharp or flat that occur in the raga and the order in which he handles them, constitute the raga. At the same time he cannot but feel that a mere knowledge of the character of the notes and their order are not enough to create a raga, and something more which forms the determining factor of the particular shade has yet to be discovered. He feels that he is unable to lay the finger on the exact point where lies the secret of maintaining the unity of chhāya. Similarly the Hindustani musician will add one more concept namely 'Vādi and Samvādi' and also give you certain 'Pakds' or catches, or small curves which constitute the peculiarity of the chhāya. What Vādi and Samvādi is, he cannot explain very clearly, though he knows what they are and can employ them for his own guidance.

The truth is that the scientific analysis of the raga is to be found only in books written before 1300 A. D. and the technology in them has to a large extent been forgotton by posterity. Although the traditional *practice* of music has been preserved in our country, the living tradition of the *theory* of music has been broken and broken irretrievably between 1200 and 1400 A. D. How exactly the dark age intervened and broke our cultural tradition, has not yet been clearly found out, but it can be safely stated that the advent of invaders has something to do with it.

From the days of Muhammad of Ghazni, the invaders have been eager to loot not only the material wealth of our country but also to secure the cultural

wealth dealing with secular interests in this land. Some of our books on science and art are known to have been carried to Ghazni, as also some of their votaries, and there translated into Arabic and Persian. The same practice appears to have been continued by his successors including those who chose to make India their home. All would have been well if this had not involved the forcible conversion of our scientists, artists and artisans from the Hindu faith, but it was not so. The result was that the custodians of our science and arts took pains to hide their knowledge, and buried or burnt their books to escape from siezure and forcible conversion. This appears to have continued till fourteen or fifteen hundred. This inference is supported by two outstanding facts in our cultural History. One is that there are practically no books on any subject written between 1300 and 1400. The other fact is that authors who have written in the 15th century or later have found it difficult to understand and follow the tradition in books written before 1200 and have had necessarily to strike a new path and coin new theories and lines of approach. This is especially so in the field of music.

And it is to be noted that although the practice of music has been preserved with greater purity in the South than in North India, the present day theory prevalent among Carnatic musicians was coined after the 14th century and is purely original and completely ignores the ancient theory, while the current theory of Hindustani musicians has in it some germs of the ancient theory still preserved in it.

Let us proceed to understand what fresh light is thrown on the constitution of the Rāga by our ancient texts. A Rāga is defined as a manipulation of notes so as to be highly enjoyable. How Rāgas are formed is detailed as follows :—

From Śrutis, Swaras are born. From Swaras are formed Grāmas. From Grāmas are born Moorchanas. From Moorchanas are formed Jātis or parent ragas. And from Jātis, the several ragas.

We already know something about Śrutis, Swaras and Grāmas. The concept Moorchhana is new to us. A moorchhana is defined as a regular ascent from any swara through seven swaras and descent back to the starting swara.

If we take any set of seven swaras composing an octave, we can start from anyone of the seven, ascend up to the seventh making use of the lower or higher octave also when necessary, and descend back to the starting swara. We can thus produce seven Moorchhanas from any set of seven swaras. They will assume the following forms :—

1. Sa Ri Ga Ma Pa Dha Ni Dha Pa Ma Ga Ri Sa.
2. Ṇi Sa Ri Ga Ma Pa Dha Pa Ma Ga Ri Sa Ṇi.
3. Dḥa Ṇi Sa Ri Ga Ma Pa Ma Ga Ri Sa Ṇi Dḥa.
4. Pa Ḍha Ṇi Sa Ri Ga Ma Ga Ri Sa Ṇi Ḍha Pa.
5. Ma Pa Dḥa Ṇi Sa Ri Ga Ri Sa Ṇi Ḍha Pa Ma.
6. Ga Ma Pa Dḥa Ṇi Sa Ri Sa Ṇi Dḥa Pa Ma Ga.
7. Ṛi Ga Ma Pa Dḥa Ṇi Sa Ṇi Dḥa Pa Ma Ga Ṛi.

Note :—The notes with a dot below are those of the lower octave.

It may appear at first sight that these seven series consisting as they do of the same seven swaras may not have any difference of melodic effect on the hearer. But the fact is, it makes a world of difference whether the series begins in Sa, Ni or Dha for the emotional quality of the musical effort. These seven Moorchhanas give seven distinct chhayas or shades as will be evident to anyone who recites them with special attention to the emotional appeal of each Moorchhana.

Instances of different raga-chhayas produced from the same set of seven swaras when we begin the moorchhana in different swaras can easily be given both in the Carnatic and Hindustani systems. Take for instance the raga 'Bhoop' of the Hindustani system. It is constituted by the swaras 'Sa Ri Ga Pa Dha' but the same swaras also constitute two other ragas 'Dēshkar' and 'Śāntakalyān'. If you ask the musician what constitutes the difference in chhaya, he will say, "In 'Bhoop' the vādi is Ga (Gandhara) and the samvādi is Dha (Dhaivata) while in 'Dēshkar' the vādi is 'Dha' and the samvādi is 'Ga'; and in 'Śāntakalyan' the vadi and Samvadi are 'Pa' (Pancham) and 'Sa' (Shadja)." It is something that he remembers at least the concept of vādi and samvādi. For you will see presently how his southern brother fares. Taking for instance rāga 'Sankarabharana' of the Carnatic system, we find that there are two other ragas constituted by the very swaras that go to form 'Sankarābharana'. They are 'Kurinji' and 'Navarōz'. Asked about their distinguishing features, the musician will point out that in

'Kurinji' there is no sanchāra below 'Ni' (Nishada) of the lower octave. That in 'Navaroz' the sanchāra ends in 'Dhaivata' of the lower octave, while in Sankarabharana, the sanchāra is unrestricted.

If we examine the answers given by the Hindustani and Carnatic musicians with reference to the concepts found in ancient texts we shall find that both of them have missed the Moorchhana concept which explains the difference in chhaya very well, although they say something very near the truth. If the moorchhanas begins in 'Ni' and ascends to 'Dhaivata' and returns back to Ni we get the chhaya of 'Kurinji'. That is in the moorchhana "Ni Sa Ri Ga Ma Pa Dha Pa Ma Ga Ri Sa Ni". If the moorchhana begins in 'Dha', goes up to 'Pa' and returns to 'Dha', we get the chhaya of 'Navaroz', that is in the moorchhana 'Dha Ni Sa Ri Ga Ma Pa Ma Ga Ri Sa Ni Dha'. For Sankarabharana we can begin the Moorchhana in Sa, Ri, Ga or Pa. i. e. in the moorchhanas :—

1. Sa Ri Ga Ma Pa Dha Ni Dha Pa Ma Ga Ri Sa.
2. Ri Ga Ma Pa Dha Ni Sa Ni Dha Pa Ma Ga Ri.
3. Ga Ma Pa Dha Ni Sa Ri Sa Ni Dha Pa Ma Ga.
4. Pa Dha Ni Sa Ri Ga Ma Ga Ri Sa Ni Dha Pa.

CHAPTER VI

THE SECRET OF MELODY

MUSIC has to do mainly with emotional appeal and, as we already saw, is mainly subjective. The science of music, therefore, properly begins with the emotional quality of particular pitches with reference to a basic note to which attention is riveted in the minds of the singer and listener. From particular pitches, the investigation is led on to groups of pitches called 'swaras' whose emotional appeal and enjoyability is more tangible than those of mere pitches. Thus it has been definitely discovered that 'Sa' or Shadja which corresponds to 'C' in the European system enriches and induces the emotion known as 'Vira', 'Roudra', and 'Adbhuta', that is, the 'heroic', the 'furious' and 'amazing'; that Rishabha or Ri which corresponds to 'D' has an appeal pertaining to what is known as 'Beebhatsa' and 'Bhayanaka' or 'disgusting' and 'fearful', that Gandhara or Ga which corresponds to 'E' appeals to what is known as 'Karuna' or the sense of 'pathos' that Madhyama or Ma and Pa which correspond to 'F' and 'G' make a special appeal to what is known as 'Sringara' or the 'erotic' and 'Hāsya' or the 'humorous'. Pa, Dha and Ni partake of the emotional appeals of Sa, Ri and Ga. This discovery is probably the most important contribution to the clarification and analysis of the emotional quality of particular notes and their combinations in music.

MELODIES OF 4 KINDS

From particular notes which are themselves enjoyable, we come next to the most important

element of music which is called 'melody' in the west and 'ranjana' or 'rakti' among us. What are the elements of melody, how it is produced, and the several varieties of it, are all dealt with in our texts with an elaborateness which must strike all scientific minds with wonder. A melody is created very often by dwelling in a single note, sometimes by ascending through a series of notes, sometimes by descending through a series of notes and sometimes by mixed movements of ascents and descents. These four modes of creating a melody are known as 'Varnas' or musical efforts. They have been given the names 'Sthāyee', 'Ārōhi', 'Avarōhi' and 'Sanchāri'.

STHĀYEE VARNA OR STATIC MELODY

The varieties of these four varnas have also been clearly formulated in our texts. When we stay in a note, that is, in a 'Sthayee Varna', there will be a melodic effect *only if there is an ebb and flow* constituting it. The ebb is called 'Prasāda' or 'pleasure of tranquillity'. The flow is called 'Tāra' or 'going high'. If during the stay in the note, you begin with 'Prasāda' and end with a 'Tāra', in other words, if there is a gradual increase in volume and richness then it is called 'Prasannādi' or a melody created by staying in a note beginning with a feeble effort and gradually increasing the effort to a height. If the Prasāda comes at the end, then it is called 'Prasannānta'. If the Prasāda is in the middle, that is to say, if the musical effort of staying in a swara begins with a good deal of effort, volume and richness,

then comes down and again increases, it is called 'Prasanna madhya'. If there is 'Prasāda' at either end it is called 'Prasannādyanta'. When the staying is jerky or irregular we get three more varieties. It may be mentioned, in passing, that *these seven Sthāyee Varnas are each peculiar to particular ragas in our country and have to be carefully practised if the Raga-Bhāva or the shade of the rāga is to be explicity brought out.* It may be safely surmised that *it is in an effort at producing these Sthayee Varunas of ebb and flow with the help of two or more simultaneous notes that the concept of harmony and harmonic chord must have taken its root in Europe.* It must also be noted that these seven modes of staying in a note are the bases for the different modes of pronunciation of notes peculiar to the different musical systems of the world about which we have dealt with already, a particular variety dominating in each system. In Carnatic music, Prasannādi dominates, in Hindustani music, 'Prasannānta' and in European music, 'Prasannādyanta'.

There are again different varieties of ascending, descending and mixed melodies. They have also been classified and formulated in the most detailed manner. Without dwelling on them, let us hasten to the more important question, "Is an ascent or descent through any number of notes enough to create a melody or is there any special feature that goes to create the melodic effect?" The answer of our ancients regarding this question is more unequivocal, rationalized and detailed than is found elsewhere.

MOVING MELODIES—THE SECRET OF MELODIC QUALITY

In going through several notes in a musical effort, the voice does not stay uniformly in all the notes. The staying is very long in certain notes, shorter in other notes and practically not at all in a third set of notes. Have you ever paused to consider if the time of stay is arbitrary or bears a necessary relationship to the melodious quality of that musical effort ? The staying in any note is indeed an indication of the taste of pleasure in that note. And conversely, the pleasure of any musical effort will depend upon the choice of the notes for staying, while proceeding up or down along the notes. *The Capacity to give pleasure depends not so much on the selection of the notes to be passed through but on the shorter or longer duration of stay in particular notes.* This is the most important law of music which unfortunately has not received the attention it deserves at the hands of musicians and theorists.

The first impression and the last impression produced on the mind are generally the most lasting. The colour of any melody or musical effort is therefore determined by the first or last note in that effort. The staying in particular notes for producing the maximum pleasure must therefore be ordered with reference to the first or the last note in that effort.

Our ancients have discovered that there is a constant interval or intervals between the initial or final note and the particular note at which we have to stay for producing the maximum musical quality.

That is the distance between Sa and Ma or Sa and Pa. The note at this distance or interval from any note is called the 'Samvādi' of that note. The starting note is called 'Vādi' and the note which is consonant with it, is the 'Samvādi'. The Westerners call this note 'Dominant' or 'Sub-dominant.' *To spend the maximum time at the Samvādi of the initial or final note is the key to the musical quality of any musical effort.* If this simple rule is only observed with care by our musicians, much of the unmusical waste of effort will be avoided, and our musical concerts will be cent per cent successes.

CHAPTER VII

DEGREES OF MELODY

Is it possible, having found the secret of melody, to measure the degree of melody or consonance between any two notes? Yes, say the texts. The note that is at a distance of the Dominant and Sub-dominant which is called Samvādi has, as we saw, the maximum consonant quality. Consonance is very much like blood-relationship, the degree whereof is measured by the number of steps taken to trace it. Similarly the degree of consonance is measured in the following manner. Repeat the use of Samvādi relationship. Starting from a note, say 'Sa', its Samvādies are 'Ma' and 'Pa'. These can be called the Samvādies of the first order. For each of these notes there must be two Samvādies. For the first note, that is 'Ma', the higher 'Sa' itself is one of the Samvādies. The other Samvadi is 'Ni' (B flat). For the second

note again, the higher 'Sa' is one of the Samvadies. The other Samvadi is 'Ri' (D). We can therefore call 'B flat' and 'D' the samvādies of the second order in relation to 'C'. In the same way we can find the samvādies of 'B flat' and 'D'. The new notes we get in this manner will be the samvādies of the third order. If we proceed in this manner, we find that we get new notes only up to the eleventh step. Thereafter if we continue the process, the same old notes reappear. We have now got 22 pitches which are the seats, so to say, of Samvadies of all orders from one to ten. These 22 pitches can thus be used to measure the degrees of melody. It will be remembered that when we discussed the concept of srutis, pitches at the minimum distance required for separate existance without beats were called by the term 'Sruti'. It is a strange coincidence that the 22 pitches that measure the degrees of melody are the self-same 22 pitches that have separate existence without beats in an octave.

We can now express the distance between notes in terms of these Śrutis. The distance between 'Sa' and 'Ma' is nine śrutis. That between 'Sa' and 'Pa' is thirteen śrutis. That is to say, the samvādies of the first order are 9 and 13 srutis from the note in question. Those of the second order are situated at an interval of 4 or 18 srutis, the intervals of the third order are 5 or 17 srutis, the fourth 8 or 14 srutis, the fifth 1 or 21 srutis, the sixth 10 or 12 srutis, the seventh 3 or 19 srutis, the eighth 6 or 16 srutis, the ninth 7 or 15 srutis, the tenth 2 or 20 srutis and the eleventh are both at 11 srutis interval.

If we take these Samvādies in order for staying, they will be found to possess less and less melodic quality as we proceed from the first order onwards. The word samvādi is restricted only to the Samvādies of the first order. The others are called '*Anuvādies*' or '*Assonants*' till we come to those of the tenth which are called *Vivādies* or *dissonants*. These are at an interval of two or twenty Srutis. With this unit of measure for measuring the melodic quality of notes at the command of composers and musicians, it is no wonder that our music has developed with a variety and subtlety which is the despair of the rest of the world.

APPLICATION OF THE PRINCIPLE OF SAMVĀDI RELATIONSHIP

We have now got the measuring rod for determining the sweetness of music and helping composers to create different degrees of melody. The question is, how to use it? We shall first deal with simple unconnected musical phrases and find out the use of the unit of melody in their construction. A musical phrase may consist of one or more notes. A phrase with a single note will be melodic only if it is sufficiently elongated with a series of ebbs and flows and this is generally used nowadays as melodic background for emotional situations in films; and their chief purpose is to enrich the emotional appeal. Phrases with two or three notes are generally constructed for maximum melodic effect with the ending note as the samvādi of the starting note or of the second note, taking care of course to see that the anuvādi that is allowed is within the first few orders. The familiar western phrases like C E G and E G C (Sa Ga Pa; Ga Pa Sa) are instances in point. But

in Indian music long intervals between notes are generally avoided in musical phrases, and it is for this reason. There is always prominence given only to one note in a phrase which is dwelt on with all its life and length and emotional expression with the help if necessary of 'Gamakas' or 'Graces'. The other notes in the phrase generally serve the purpose of leading up to it and are generally very near each other so as to form more or less a smooth curve. In this type it is easily seen that we can't have samvādies in a phrase of three notes. All that we can do is to avoid vivādies. It may at once be mentioned that in Indian music we have got only two sets of vivadies which are recognised as such. They are 'Ri Ga' both of the lowest variety (C sharp and E flat of the major scale series) and 'Dha Ni' both of the lowest variety (G sharp and B flat). All other sets of swaras are excluded from that stigma in spite of the fact that they may be at an interval of 2 or 20 srutis. The reason for this will be discussed later.

Phrases with 4 or 5 notes can easily contain samvādies at the beginning and end without leaving off any of the seven notes in the middle and these are very popular in India. The starting note or the ending note determines the emotion, and its samvadi either before or after, adds life to it and makes it complete. In phrases of more than five notes the rule is that the note chosen for determining the emotional quality of the phrase, that is to say, the note in which you stay longest must be one which has its samvadi present in the series of notes composing that phrase. A corollary from that rule, namely, *that you must stay as little as possible in the note which has not got its samvadi in the phrase itself*, follows.

CHAPTER VIII

PRAKRITI AND VIKRITA SWARAS

THE making of melodies is, as we saw, really a very simple process when we realise the importance of staying in Samvādies. The distance between a note and its samvādi is either 9 or 13 srutis in terms of the 22 srutis per octave. It will be easy to find out the samvādi relationship between the notes commonly used in any system of music if we know the exact pitch where they are produced. We shall therefore try to get a definite idea of the notes and their position in the octave in the Indian and European systems. But one has to remember that *too much attention to the position of the notes is likely to divert us from the concentration on the melodic curve which is really the soul of music.* This will be realized if we trace the several stages by which a lover of music developes his knowledge.

THE HISTORY OF A CONNOISSEUR.

Music-lovers begin by listening to really sweet music which nobody can help listening to. They seek to improve their capacity to enjoy music by trying to remember the names of the ragas of well-known pieces, catching their haunting snatches of melody and trying to recognise them when they are sung elsewhere. A radio in the house with the listener by the side is a tempting tutor in these self-taught lessons. A sister or a daughter who is undergoing a regular tuition often gets a deal of mirth when the growing connoisseur exhibits his mastery now and then and tries to recognise unknown modes. His earnestness now increases.

He always takes care to sit by the side of a knowing friend in every concert, and gets his suspicion confirmed or corrected about the names of the ragas as and when they are sung. When his friend delays his answer, you can easily note from his face the difference between non-intelligent and intelligent appreciation of ragas before and after their recognition. After a time he begins to make his own efforts at singing. And if his voice is not absolutely useless he does succeed in getting the principal shape of ragas he knows. By this time he has learnt the number of units in the few principal talas. We may now call him a safe and desirable lover and judge of music.

But he is not satisfied with this. He feels envious of the superior knowledge of some of his friends, when they reproduce or discuss the principal catches of particular ragas by the names of the swaras. He makes sly enquiries how those friends aquired the swaragnāna or the knowledge of swaras-whether they have undergone the full course of training beginning from 'swarāvali' (or 'sargam' as they call it in North India). He learns to his surprise that those friends have only listened to regular courses of instruction, at the most, and have generally not undergone the discipline of singing themselves; specially communicative companions tell him that the acquisition of 'swargnānam' is as easy or difficult as swimming, that you never learn it unless you try it, if necessary, with aids at the beginning, and that it has taken several years for them to get a fair mastery in the field.

He follows the lead and in a few years becomes familiar with the position of the notes and their shades or differences. But in course of time our full-fledged connoisseur begins to doubt his own analysis of musical phrases into swaras. He finds several curves that are not amenable to analysis. He finds the same variety of swara being differently pronounced in different ragas. *He begins to feel that after all, he was surer of his position when he relied on the mere shade or curve without analysis into swaras, and that very often when the attention is engrossed by the constituent swaras the living form of the raga is missed.*

This short sketch of the growth of knowledge in an earnest lover of music is given here to show *the limitations of analysis of ragas into swaras.* All the same, the capacity to recognise shades of difference of pitches and pronounciation of swaras, is absolutely necessary if not for a lover of music, at least for the musician and the critic of the art. With this note of caution, we shall study the natural and modified forms of swaras.

THE NOTES NATURAL AND MODIFIED.

Our ancient texts speak of the seven natural notes or 'Prakriti Swaras' and 'modified' or 'Vikrita Swaras'. The description of these artificial or modified swaras as 'Sadharana' (common-featured) is of special significance. Suppose a swara occurs in a raga, whose staying pitch is higher than that of 'Ga' but lower than that of 'Ma'. This new artificial or *modified swara is said to contain the features of the two natural swaras on either side of it.* The law of musical science that the swaras are only seven in an

octave, is only confirmed by the feasability of creating new artificial or modified swaras by combining the properties of any two successive swaras. This is the position of the flats and sharps in relation to the natural ones according to our texts of music. With these preliminary points we can now give the names of the normal and the sharps or flats that are in common use in South Indian, North Indian and the European systems of music and the pitches at which they stay. *This table will be very useful for the application of the rule of Samvādi in the creation of melodies.*

The normal notes in the three systems, and their position :—

Sruti No.	South Indian	North Indian	European
4th	Sa	Sa	C
7th	Ri	—	—
8th	—	Ri	D
9th	Ga	—	—
12th	—	Ga	E
13th	Ma	Ma	F
17th	Pa	Pa	G
20th	Dha	—	—
21th	—	Dha	a
22nd	Ni	—	—
23rd	—	Ni	b

The normal notes are called 'Suddha' swaras both in the South Indian and North Indian systems. It will be noted that the position of the Suddha swaras vary for the 4 swaras Ri, Ga, Dha, and Ni in the South and North. Strange to say, the normal notes of the European system are the same as those of North India.

The naturals, Sharps and Flats in the South Indian System are, according to current theory, 12 notes of which 4 are given two names (due to difference in composition). But in practice we are using 16 notes of which four can each be given two names, thus making up 20 notes. They are :—

Notes	Śruti No.	Composition	Name
Sa	4th	4 Śrutis—1, 2, 3 & 4	Shadja
Ri_1	7th	3 Śrutis—5, 6 & 7	Suddha Rishabha
Ri_2	8th	4 Śrutis—5, 6, 7 & 8	Chatu Śruti Rishabha
Ri_3	9th	5 Śrutis—5, 6, 7, 8 & 9	Pancha Śruti Rishabha
Ri_4	10th	6 Śrutis–5, 6, 7, 8, 9 & 10	Shat Śruti Rishabha
Ga_1	9th	2 Śrutis–8 & 9	Śuddha Gandhara
Ga_2	10th	3 Śrutis—8, 9 & 10	Sādharana Gandhara
Ga_3	11th	2 Śrutis—10 & 11	Old Antara Gandhara
Ga_4	12th	2 Śrutis—11 & 12	New Antara Gandhara
Ma_1	13th	4 Śrutis—10, 11, 12 & 13	Śuddha Madhyama
Ma_2	16th	3 Śrutis—14, 15 & 16	Prati Madhyama

Notes	Śruti No.	Composition	Name
Pa	17th	4 Śrutis—14, 15, 16 & 17	Panchama
Dha_1	20th	3 Śrutis—18, 19 & 20	Śuddha Dhaivata
Dha_2	21st	4 Śrutis—18, 19, 20 & 21	Chatuś Śruti Dhaivata
Dha_3	22nd	5 Śrutis—18, 19, 20, 21 & 22	Pancha Śruti Dhaivata
Dha_4	23rd (1st)	6 Śrutis—18, 19, 20, 21 22 & 23	Shat Śruti Dhaivata
Ni_1	22nd	2 Śrutis—21 & 22	Śuddha Nishāda
Ni_2	23rd (1st)	3 Śrutis—21, 22 & 23	Kaiśiki Nishāda
Ni_3	24th (2nd)	2 Śrutis—23 & 24	Old Kākali Nishāda
Ni_4	25th (3rd)	2 Śrutis—24 & 25	New Kākali Nishāda.

The current theory treats as one the 2 notes in 8th & 9th Śrutis (Rishabhas)
11th & 12th ,, (Gandharas)
21st & 22nd ,, (Dhaivatas)
24th & 25th ,, (Nishādas)

A comparative list of all the notes natural, Sharps and Flats in use in the three systems :—

Śruti No.	South Indian	North Indian	European
4th	Shadja	Shadja	C
5th	—	—	D flat
6th	—	—	B sharp
7th	Śuddha Rishabha	Komal Rishabha	C sharp
8th	Chatuśśruti Rishabha	Śuddha Rishabha	D
9th	Pancha Śruti Rishabha Śuddha Gāndhāra	Tivra Rishabha	E flat
10th	Shatśruti Rishabha Sādharana Gandhara	Komal Gāndhāra	F flat
11th	Old Antara Gāndhāra	—	D sharp
12th	New Antara Gāndhāra	Śuddha Gandhar	E
13th	Śuddha Madhyama	Śuddha Madhyam	F
14th	—	—	G flat
15th	—	—	E sharp
16th	Prati Madhyama	Tīvra Madhyam	F sharp

Śruti No.	South Indian	North Indian	European
17th	Panchama	Panchama	G
18th	—	—	A flat
19th	—	—	—
20th	Śuddha Dhaivata	Komal Dhaivata	G sharp
21st	Chatuśśruti Dhaivata	Śuddha Dhaivata	A
22nd	Pancha Śruti Dhaivata Suddha Nishada	Tīvra Dhaivata	B flat
23rd (1st)	Shatsruti Dhaivata Kaiśiki Nishada	Komal Nishāda	C flat
24th (2nd)	Old Kākali Nishāda	—	A sharp
25th (3rd)	New Kakali Nishada	Śuddha Nishada	B

With this table before us, it is very easy to find the Samvādis of the several notes which are 9 or 13 Śrutis distant.

CHAPTER IX

UNITY OF EMOTION

THE TWO PATTERNS OF ART—IDEAL AND PROVINCIAL

In every art we have two sets of patterns. One is the perfect pattern which is the basis of the science of the art and has the ideal quality of satisfying all tastes. The other is the approximation to it of varying degrees of faithfulness, and falling short of the ideal, has necessarily to shape itself to suit different tastes, provincial or othervise. The main difference between these two patterns from the view-point of the science of the art is, that in addition to its short-comings in comparison with the perfect pattern, there is an element of arbitrariness in the second pattern from which the perfect pattern is free.

These two patterns have been given technical terms in all the arts of our country. The perfect pattern is called 'Mārga' (The Path as laid down) style and the second is called the 'Dēsi' (provincial) style.

RĀGAS AND THEIR PARENTS, THE JĀTIS

We have so far studied the elements that go to make up melody which is the soul of music. We have next to enter the domain of melodic design or Rāga. We shall follow the well-trodden path of our seers till we have to part company from their rules to understand music of various climes with all their arbitrary sub-versions. We saw that there are two families or organic groups of swaras called 'Grāmas', born

respectively from Shadja and Madhyama. We noted also that rāgas or melodic designs have correspondingly a two-fold classification into Shadjagrāma rāgas and Madhyamagrāma rāgas. Ragas however, it must be noted, are not among the first generation of melodic designs. They are born from the generic designs which have been given a special name, Jāti (that from which the ragas are born).

COMPOSITION OF NOTES IN THE TWO GRĀMAS

According to Mārga or perfectly scientific system, the two natural grāmas of music are constituted by the swaras whose constitution and staying srutis differ a little in the two swaras 'Pa', and 'Dha'. In the Shadjagrama 'Pa' is formed by the four srutis, 14th, 15th, 16th and 17th and has the 17th as it staying sruti; 'Dha' is constituted by the three srutis 18th, 19th and 20th and has 20th as its staying sruti. But in the Madhyamagrama 'Pa' is constituted by the three srutis 14th, 15th and 16th and stays in the sixteenth, while 'Dha' is constituted by the 4 srutis 17th, 18th, 19th and 20th and stays in the 20th. Though the swaras of the two grāmas differ so little, still in melodic effect there is a real difference, Shadjagrāma being more masculine than the Madhyamagrāma.

THE FOURTEEN MOORCHHANAS

We saw that from every set of seven swaras we can have seven moorchhanas each giving rise to a different rāga chhāya. Each of the two grāmas

therefore gives rise to 7 moorchhanas making 14 moorchhanas for the 2 gramas. Thus in the Mārga system, we start with the fourteen moorchhanas as the basis for the formation of the ragas. As these 14 moorchhanas are very important, they have been given each a special name. The names are unfamiliar to those who are not engaged in research, but it is well that they become commonly known, though they may appear jaw-breaking. In the Shadjagrama the moorchhanas beginning with Sa, Ni, Dha etc. respectively are called 'Uttaramandra', 'Rajani,' 'Uttarāyata' etc. Similarly in the madhyamagrāma the moorchhanas beginning with Ma, Ga, Ri etc., are called 'Souvīri', 'Hariṇāśvā', Kalōpanatā etc. From these fourteen moorchhanas, the parent designs of ragas are formed. Before we proceed to understand the formation of the parent designs, it is necessary to satisfy the enquiry of the earnest student as to why a moorchhana should be formed by ascending and descending through seven swaras and not more or less.

WHY MOORCHANAS HAVE SEVEN SWARAS ONLY

We noticed that in every moving melody the initial or the final note generally determines the emotional quality of the particular musical phrase. We also noticed that different notes enrich different emotions. Therefore, *to begin in a particular note and ascend up to its samvādi completes a perfect musical phrase with a definite emotional quality.* If you want another ascending phrase of the same emotional type, you will have to *begin* in the same note in the higher or

lower octave and go up to its Samvādi. Suppose you are singing continuously ascending from some note. Then if you want to maintain the same emotional quality throughout, you will have to *begin again* in the same note in the higher octave. In a continuous ascent, you cannot be said to *begin again* in a particular note unless you *stop* at the preceding note. It will be remembered that the eighth note is the same as the beginning note, in the higher octave. So if you want *to begin* at the eighth note again, you will have necessarily to stop at the seventh, so that a fresh effort at starting may be made at the eighth. Moorchhana therefore has to stop the ascent at the seventh note in an ascending series. This is necessary for maintainning the unity of emotion, for if you stay in any other note say the fifth, sixth, eighth, ninth etc. *you will have to begin at the next note which will bring in a different emotion.* The same rule holds good for a descending series also. *The essence therefore of a moorchhana is that it must stop at the end swaras of that series of seven notes and turn back. A moorchhana in fact is a closed curve formed by the two arcs namely the ascent and descent through the seven notes.*

THE REQUISITIES OF A MOORCHHANA

We must not forget that *moorchhana is not a mere mathematical possibility, but a highly melodic formation helping us to maintain unity of emotion.* The requisites of melody must therefore be present in every moorchhana in ample measure. *The first requisite of a melodic phrase is that it should contain*

within itself the samvadies of the beginning and ending swara of that phrase. Another feature that will go to enrich the melodious quality of the phrase is that each note should have if possible its samvādis in the phrase itself. The presence of a samvādi in a group is in fact the determining factor of the melodic power of any note.

If we apply this test to the swaras of the Shadja-grāma and the Madhyamagrama you will find that each of the swaras is supported by its samvadi in the respective series of seven notes, There is therefore no difficulty in all the fourteen moorchhanas being highly melodic closed curves.

CHAPTER X

JĀTIS OR PARENT RAGAS

MOORCHHANAS AND THEIR FUNCTION

THE series of melodic phrases all sub-serving a single emotional appeal form a 'Raga'. The closed curve of a 'moorchhana' serves as a broad boundary for containing all these phrases. The ends of the moorchhana, it must be remembered, serve as the turning points of the curve or to use mathematical language, the 'maxima' and 'minima' points of the curve. The curve can of course be repeated in the higher and lower octaves. How that is done in practice is the next question.

HOW TO CONNECT THE MOORCHHANAS IN THE HIGHER AND LOWER OCTAVE

The human voice is capable of producing three octaves. But practically speaking, we cannot without difficulty produce more than two and a half octaves. The closed curve for a 'Rāga' is usually begun in the 'madhya sthāyee or middle octave. After dwelling in this sthāyee, the singer proceeds to the higher sthāyee. In passing to the higher moorchhana, we have to bear in mind the characteristic property of the moorchhana, namely, that it stops at the ends. *It is therefore necessary that a sufficiently long stay should be observed at the end-swaras before proceeding to the beginning swara of the next higher or lower moorchhana ; or you may jump from the lower to the higher moorchhana leaving off one of the end swaras.* An illustration will make this clear. Take, for instance, the well-known Raga of the south, 'Nāta'. Its moorchhana begins in Gandhāra and ends in Rishabha. That is to say, the moorchhana is Ga Ma Pa Ni Sa Ri — Ri Sa Ni Pa Ma Ga. Now, in the sanchāras of that Rāga, when you wish to proceed higher that Ri, you have to stay sufficiently long at Ri and make a fresh start from Gā, the beginning of the higher moorchhana. Or, you can jump from Sa to Ga or from Ri to Mā, in other words, you can have the sancharas Sa Ga Ma or Sa Ri Ma but not 'Sa Ri Ga Ma'. Similarly, when you proceed to the lower octave, you can have 'Ga Sa' or 'Ma Ri' but not 'Ma Ga Ri Sa'.

THE TWO EMOTIONAL APPEALS OF A MOORCHHANA

Before we actually analyse the process by which a 'rāga' is built or expanded from a moorchhana, we have to study the emotional qualities of moorchhanas more closely. As pointed out already, a moorchhana is built up on the basis of the fact that the initial note determines the emotional quality of a musical phrase. A moorchhana has an ascent as well as a descent. The ascent of a moorchhana begins in a particular note, and it therefore subserves its corresponding emotion. The descent which begins in the seventh note from the beginning has a different emotional quality. A moorchhana therefore has two different emotional appeals, one in the ascent and the other in the descent, You must therefore make sure in every rāga whether it is in the ascent or in the descent of the moorchhana that the rāga is born and has its being, or in other words, whether there is Rāga-prakāśa in the Ārohi or Avarohi Varna.

JĀTIS OR PARENT RĀGAS

We can now consider how a raga is built up. Ragas as we have already seen are designs in swaras formed and expanded maintaining unity of emotion. It is a well-known fact that every artistic design has a base on which it is constructed. Similarly every raga has a base on which it is formed. It will be easily seen that we can have a number of designs on a single base and that all the designs on one base will have certain common features. A base with its common features can well be called a parent design.

This analogy with explain the concept of 'Jāti' or 'parent Raga' and its relation to the ragas born from it.

NYĀSA OR THE BASE OF THE RĀGA DESIGN

A traveller who goes about stays wherever he finds comfort, and when he finds a place specially inviting he makes it the headquarters for the tour. Similarly in the sancharas through the swaras, you stay in those particular swaras that suits your mood, or in other words, that subserves the emotion you have in view, a little longer than in the other swaras; and there is a particular swara where musical pleasure is at its height, so much so, that you are not inclined to move from that swara. *The former is called the 'Amśa' swara or the swara which decides the emotional quality of the Raga, and the latter is called the 'Nyāsa' swara of the swara where the raga attains its completeness and has its finale.* It is within the experience of musicians when they expand the Raga by several phrases, that after certain phrases there is a feeling of completeness and no inclination to go further for completing the musical idea. In the same way there are phrases which are felt to be incomplete and call for further phrases for perfecting the idea. The note at which you feel a sense of completeness is called the Nyāsa of the Raga. It is in fact the base of the raga and is easily recognised as the swara at which the raga-expansion has its natural end. The word Nyāsa is derived from 'Ni' and 'Aus'. 'Ni' stands for 'Nitarām' (=well) and 'Aus' means (to sit). It is the swara where the rāga sits well and therefore serves as its base.

EACH NYĀSA GIVES RISE TO A JĀTI

To return to the anology of the design. Just as you can have a number of designs on a single base, simiiarly, you can have a number of ragas with a single Nyāsa swara. The common features of all these ragas give rise to the parent design or Jāti.

We therefore start the creation of the parent design or 'Jāti' by choosing its Nyāsa. We have seven swaras and we can therefore have seven Nyāsas giving rise to seven 'Jatis'. The Jātis naturally get their names from those of the Nyāsa swaras. Thus the seven Jātis are called severally Shādji, Ārshabi, Gāndhāri, Madhyamā, Panchamī, Dhaivatee and Naishādi after the seven swaras Shadja, Rishabha, Gāndhāra, Madhyama, Panchama, Dhaivata and Nishāda.

Having chosen the Nyāsa swara, you begin to pronounce it with maximum melodic effect so that you can dwell continuously in it deriving pleasure every instant and never be satiated. *One method of effecting the maximum melodic effect is to start from the Samvādi (Dominant or Sub-dominant) of the particular Nyāsa swara and end with the Nyāsa.* Having effected this maximum melodic effect, we must proceed to move about the Nyāsa adding to it the next swara in a wavy motion. We now get a short melodic curve. Then we lengthen the curve by adding to it the third swara and then the fourth and so on, *always taking care to return and stay at the Nyāsa.*

This you do till you come to the Samvādi of the Nyāsa. This swara naturally affords more pleasure than its predecessors because it has got a 'consonant' effect in relation to the Nyāsa and has more or less a similar emotional quality. Here you have to stay. *This swara naturally helps us to determine the moorchhana for the chhāya of the Jāti. For we have to stay in the swara, and it must naturally be one end of the moorchhana.*

We shall make this position clear with reference to an illustration. Take Shādji Jāti for instance. Its Nyāsa is Shadja. Starting from Shadja you proceed in a wavy march till you come to the Samvādi of Shadja, namely, Panchama. Here you have to stay. Panchama is therefore the end of the moorchhana which can coveniently be taken as the foundation of the chhāya of Shādji Jāti. The moorchhana ending in Panchama begins in Dhaivata. That is 'Dha Ni Sa Ri Ga Ma Pa-Pa Ma Ga Ri Sa Ni Dha' is the moorchhana. We thus understand the rationale of the rule in the texts that Shādji Jāti is born in the moorchhana beginning with Dhaivata. It is also clear that this moorchhana belongs to the Shadja Grama and not to Madhyama Grama, because the Panchama which is the samvādi of Sa must belong to Shadja Grama. Thus we see that the Nyāsa determines the moorchhana of the Jāti and of the Ragas born from it.

CHAPTER XI

HOW RAGAS ARE BORN FROM JĀTIS

WE have seen how unity of Emotion is secured by means of the Moorchhana and how Nyāsa or the 'Finale' of the Raga determines its Moorchhana which therefore constitutes the common feature of all Ragas conceived with the particular note as Nyāsa. We also saw how this common feature gives rise to the concept of 'Jāti' or parent-Raga and how we can have seven 'Jatis' each with one of the seven swaras as 'Nyāsa'. We discovered in the very first step in the expansion of the Jāti that the Nyāsa determines the moorchhana of the Jāti or Raga. How to expand further a Jati or Raga is our next step in understanding the science.

THE AMSĀ SWARA OR VĀDI

The very fact that a number of Ragas can be formed with a single Nyāsa will indicate that the Nyāsa with all its importance is not the decisive factor in determining *the exact emotional quality of the Rāga.* We have already mentioned another concept 'Amśa Swara', (See chap. p: 48). This swara is the most important element of a Raga and determines the emotional quality of the Rāga. It is because the Raga is born of that 'Amśa' or 'part' of the gamut that this important swara is called by that name. One rule in Raga expansion is that the Amsa swara should be touched as often as possible. Being the most important swara in the Rāga it is called the

'Vādi' or the 'expounder' of the Rāga and its consonant is called the 'Samvādi' of the Rāga.

MOORCHHANAS AND KRAMAS

A question will now naturally suggest itself to the reader. We have found that the Nyāsa determines the Moorchhana of the Rāga, and this latter determines the Emotional quality of the Rāga. How is it then possible to have a number of Ragas which means a number of emotional qualities with the same moorchhana? The answer to this question is supplied by another concept called 'Krama'.

MOORCHHANAS ARE CLOSED CURVES

The explanation of this concept requires a clear view of what a Moorchhana is. A moorchhana is a cycle of swaras consisting of the upward and the downward seven. This cycle determines the main chhāyā of the Raga and its chief characteristic is the necessity to stop and turn back at the upper end and lower end swaras. Now we must fix the form of the cycle firmly in our minds if we should understand clearly the next phase of the Raga, namely 'Krama'. Having fixed in the form of 7 circles, the seven moorchhanas of the Grama, we can now contemplate the possible variations in going along the swaras of each cycle. Now each Moorchhana when represented by a circle has 12 swaras arranged on the circumference of a circle, as the end swaras appear only once when reduced to a continuous cycle, as shown below:-

1\. Sa
Ri Ri
Ga 1st Ga
Ma moorchhana Ma
Pa Pa
Dha Dha
Ni

2\. Ni
Sa Sa
Ri 2nd Ri
Ga moorchhana Ga
Ma Ma
Pa Pa
Dha

3\. Dha
Ni Ni
Sa 3rd Sa
Ri moorchhana Ri
Ga Ga
Ma Ma
Pa

4\. Pa
Dha Dha
Ni 4th Ni
Sa moorchhana Sa
Ri Ri
Ga Ga
Ma

5\. Ma
Pa Pa
Dha 5th Dha
Ni moorchhana Ni
Sa Sa
Ri Ri
Ga

6\. Ga
Ma Ma
Pa 6th Pa
Dha moorchhana Dha
Ni Ni
Sa Sa
Ri

7\. Ri
Ga Ga
Ma 7th Ma
Pa moorchhana Pa
Dha Dha
Ni Ni
Sa

Now take the 1st cycle. We can start from Sa and go round the circle till we come to Sa again. We can also start from Ri and come back to Ri. Similarly, we can finish the cycle from any one of the 12 points of the cycle. Thus we get 12 different Sanchāras *each of which falls within the first moorchhana, because in each of them, the Sanchara stops and turns back at the end*

swaras Sa and Ni of the moorchhana. The 12 Sancharas we get for the 1st moorchhana are these :—

1. *Sa* Ri Ga Ma Pa Dha *Ni* Dha Pa Ma Ga Ri Sa
2. Ri Ga Ma Pa Dha *Ni* Dha Pa Ma Ga Ri *Sa* Ri
3. Ga Ma Pa Dha *Ni* Dha Pa Ma Ga Ri *Sa* Ri Ga
4. Ma Pa Dha *Ni* Dha Pa Ma Ga Ri *Sa* Ri Ga Ma
5. Pa Dha *Ni* Dha Pa Ma Ga Ri *Sa* Ri Ga Ma Pa
6. Dha *Ni* Dha Pa Ma Ga Ri *Sa* Ri Ga Ma Pa Dha
7. *Ni* Dha Pa Ma Ga Ri *Sa* Ri Ga Ma Pa Dha Ni
8. Dha Pa Ma Ga Ri *Sa* Ri Ga Ma Pa Dha *Ni* Dha
9. Pa Ma Ga Ri *Sa* Ri Ga Ma Pa Dha *Ni* Dha Pa
10. Ma Ga Ri *Sa* Ri Ga Ma Pa Dha *Ni* Dha Pa Ma
11. Ga Ri *Sa* Ri Ga Ma Pa Dha *Ni* Dha Pa Ma Ga
12. Ri *Sa* Ri Ga Ma Pa Dha *Ni* Dha Pa Ma Ga Ri

Note :— Sa and Ni are italicised only to show that they are the end swaras of the moorchhanas. They do not indicate any Sthayee.

Similarly we get the following 12 Sancharas for the 2nd moorchhana :—

1. *Ni* Sa Ri Ga Ma Pa *Dha* Pa Ma Ga Ri Sa Ni
2. Sa Ri Ga Ma Pa *Dha* Pa Ma Ga Ri Sa *Ni* Sa
3. Ri Ga Ma Pa *Dha* Pa Ma Ga Ri Sa *Ni* Sa Ri
4. Ga Ma Pa *Dha* Pa Ma Ga Ri Sa *Ni* Sa Ri Ga
5. Ma Pa *Dha* Pa Ma Ga Ri Sa *Ni* Sa Ri Ga Ma
6. Pa *Dha* Pa Ma Ga Ri Sa *Ni* Sa Ri Ga Ma Pa
7. *Dha* Pa Ma Ga Ri Sa *Ni* Sa Ri Ga Ma Pa Dha
8. Pa Ma Ga Ri Sa *Ni* Sa Ri Ga Ma Pa *Dha* Pa

9. Ma Ga Ri Sa *Ni* Sa Ri Ga Ma Pa *Dha* Pa Ma
10. Ga Ri Sa *Ni* Sa Ri Ga Ma Pa *Dha* Pa Ma Ga
11. Ri Sa *Ni* Sa Ri Ga Ma Pa *Dha* Pa Ma Ga Ri
12. Sa *Ni* Sa Ri Ga Ma Pa *Dha* Pa Ma Ga Ri Sa

In the same way, it is easy to imagine the Kramas for the 5 other moorchhanas. Thus for every grāma we get 84 Kramas. The use and importance of the Krama can be understood from the following facts;—

(*i*) In every musical effort, the emotional quality is determined by *the initial note or the final note.* In the 1st case the 'Vādi' is the initial note of the phrase and its 'Samvādi' will of course, have to exist within the phrase and given due prominence to ensure the melodic quality. In the latter case, the Samvādi is the final note of the phrase and its Vādi will have to exist within the phrase with due prominence.

Now, in the cycle consisting of an Ārōhaṇa and Avarōhaṇa, (ascent and descent through seven swaras), each Krama of the moorchhana gives us a fresh set of Vādi and Samvādi, both for the Ārōhana and the Avarōhana Sanchāra. Thus the Kramas help us to vary the Vādi and Samvādi as we please in any moorchhana and create new ragas with new emotional qualities.

Thus we arrive at this conclusion that out of every set of seven swaras, we can have seven species of chhāyas and out of each of the seven species we

can have 12 sub-species of chhāyas by the variation of Vādi and Samvādi. There is therefore the possibility of constructing 84 ragas for each set of 7 swaras.

This method of creating derivative ragas appears to have found favour in the ancient Tamil system of music where the 'Pans' (பண்கள்) or principal ragas and Tirams (திறங்கள்) or derivative ragas are said to be created by going round the cycle of each 'Pālai' (பாலை) or moorchhana 12 times.

Let us work out the possible Vādis and Samvādies in the 12 Kramas of the 1st moorchhana by way of illustration. The Shadja Grāma swaras form, of course, the basis of our operation. We know that a Vādi is the beginning note of a musical effort and Samvādi is the consonant note where we stay for maximum melodic effort. We can therefore take the 1st note of a series, call it Vādi and trace its Samvādi; or take the last of the series, call it Samvādi and trace its Vādi backwards.

Thus in the ascending phrase Sa Ri Ga Ma Pa Dha Ni, we can take Sa as the Vādi and say Ma and Pa are its Samvādies; or we can take Ni as the Samvadi and say Ga is its Vādi. Thus for the ascending phrase the Vādis and Samvādi are-Vadi Sa, Samvadi Ma and Pa; Vadi Ga, Samvadi Ni. Following this rule we get the following table of Vādis and Samvādis for the twelve Kramas of the first moorchhana :—

Of course the bases of our operation are the Shadja Grama swaras as stated already :—

Krama	Ārōhana or Avarohana	Vādi	Samvādi
1	Ārōhana	Sa	Ma or Pa
		Ga or Ma	Ni
	Avarōhana	Ni	Ga or Ma
		Pa or Ma	Sa
2	Ārōhana	Ri	Dha
		Ga or Ma	Ni
	Avarōhana	Ni	Ma or Ga
		Dha	Ri
3	Ārohaṇa	Ga or Ma	Ni
	Avarōhaṇa	Ni	Ma or Ga
4	Ārōhaṇa	Ma	Ni
		Sa	Ma
	Avarōhaṇa	Ni	Ma or Ga
		Pa, Ma	Sa
5	Avarōhaṇa	Ni	Ma or Ga
		Pa, Ma	Sa
	Ārōhaṇa	Sa	Ma, Pa
6	Avarōhaṇa	Ni	Ma or Ga
		Pa, Ma	Sa
	Ārōhaṇa	Sa	Ma Pa
		Ri	Dha
7	Avarōhaṇa	Ni	Ma or Ga
		Pa, Ma	Sa
	Ārōhaṇa	Sa	Ma Pa
		Ga or Ma	Ni

Krama	Ārōhana or Avarohana	Vādi	Samvādi
8	Avarōhaṇa	Dha	Ri
		Pa, Ma	Sa
	Ārōhaṇa	Sa	Ma Pa
		Ga or Ma	Ni
9	Avarōhaṇa	Pa	Sa
		Ma	Sa
	Ārōhaṇa	Sa	Ma Pa
		Ga or Ma	Ni
10	Avarōhaṇa	Ma	Sa
	Ārōhaṇa	Sa	Ma Ma
		Ga or Ma	Ni
11	Ārōhaṇa	Sa	Ma Pa
		Ga or Ma	Ni
	Avarōhana	Ni	Ga or Ma
12	Ārōhaṇa	Sa	Ma Pa
		Ga or Ma	Ni
	Avarohana	Ni	Ma or Ga
		Dha	Ri

We now understand how a moorchhana which controls the main emotional quality of the Jati can give rise to a number of Kramas with varying subsidiary emotional appeals allied to the main emotional quality—in other words, how a Jati can give rise to a number of Ragas.

CHAPTER XII

JĀTIS, PURE, MODIFIED AND MIXED

We have seen how the concept of Krama helps us to have a variety of Amśa Swaras thus giving rise to a variety of Rāgas each with its own emotional appeal. These Rāgas before they were given particular names have simply been regarded as modified Jātis. Jātis are said to be 'pure' when the Amśa Swara is the same as the Nyāsa Swara; they are said to be modified if the Amśa Swara is different from the Nyāsa Swara.

CAN ALL THE SWARAS BE CHOSEN AS AMŚA SWARAS IN A JĀTI

The next question to be considered is whether each of the seven swaras can be chosen as the Amśa Swara for a Jāti. A close study of the several Kramas of a moorchhana is necessary for deciding this question. It will be seen that in the Ārōhana part of some of the Kramas the initial note has not got its Samvadi in that part. For instance among the Kramas of the 1st moorchhana in p. 54 of chapter XI, take the one beginning with Pa, namely Pa Dha Ni Dha Pa Ma Ga Ri Sa Ri Ga Ma Pa; the Ārōhaṇa part of it, namely, Pa Dha Ni does not contain 'Sa' the Samvadi of Pa. We cannot therefore have Panchama as the Amśa for the Raga formed with the Arohi part of this Krama as its basis. In fact, if we examine the Ārohi part of all the 12 kramas of the 1st moorchhana, you will find that Pa and Dha do not find a place among the Vādis.

Thus arises the rule that limits the possible Amsas in particular Jatīs. The following table gives the moorchhana and possible Amśas for the seven Jātis :—

Jātī	Moorchhana	Possible Amśas
1. Shādji	DhaNiSaRiGaMaPa PaMaGaRiSaNiDha (Shadja Grāma)	Sa,Ga,Ma, Pa,Dha.
2. Ārshabhī	PaDhaNiSaRiGaMa („) MaGaRiSaNiDhaPa	Ri, Dha, Ni
3. Gāndharī	PaDhaNiSaRiGaMa MaGaRiSaNiDhaPa (Madhyamagrama)	Sa,Ga,Ma, Pa,Ni.
4. Madhyamā	RiGaMaPaDhaNiSa („) SaNiDhaPaMaGaRi	Sa,Ri,Ma, Pa,Dha
5. Panchami	RiGaMaPaDhaNiSa („) SaNiDhaPaMaGaRi	Ri, Pa
6. Dhaivati	RiGaMaPaDhaNiSa SaNiDhaPaMaGaRi (Shadjagrāma)	Ri,Dha
7. Naishādi	RiGaMaPaDhaNiSa („) SaNiDhaPaMaGaRi	Sa,Ga,Ni

The rationale of the Moorchhanas and Amśas of these Jātis is not clear in some cases and requires further research.

DISSONANT NOTES (VIVĀDI SWARAS)

We have hitherto considered the formation of Jātis using all the seven Prakriti swaras in its formation. But we have to face one difficulty in the

Sanchāras of these Jatis and that is the handling of Vivādi swaras or dissonant notes namely Ri Ga and Dha Ni. In passing, *it may be noted that the dissonance is felt only between Ri and Ga both Prakriti swaras (C sharp and E flat), and Dha and Ni both prakriti swaras (G sharp and B flat). Among Vikrita swaras, we do not feel dissonance although they may be 2 srutis apart,* for instance between Chatuśśruti Rishabha (8th Sruti) and Sādhārana Gāndhāra (10th Sruti), that is D and F flat. The reason for this is to be found in the use of the word 'Sādhārana' or 'Common-featured' for Vikrita swaras in the texts. It is laid down that the natural swaras are only seven and that the other swaras are modified ones and are composed of the properties of the two swaras on either side of them. *Thus the Vikrita Swaras having each the properties of 2 swaras have no dissonance with any other swara.* The exact significance of the word 'natural' and 'artificial' has to be sought for in the origin of swaras or notes and their capacity to afford pleasure by their similarity to the elements of Anāhátā Nāda, the primary elements of Anāhata Nada being termed 'Prakriti Swaras'.

HOW TO AVOID DISSONANCE

To avoid dissonance is as important as securing consonance in building up a melody. There are two methods of avoiding dissonance. One is to slur over one of the two dissonant notes. The other is to coin only those phrases where the dissonant note does not appear within their ambit. When you want to avoid an undesirable person on your way, you walk fast

when you have to pass by his residence, or you choose a path in such a way that his residence is kept away from your path. These two common-sense rules have been given technical names. The first is called 'Langhana' or 'jumping over'. The other is called 'Anabhyāsa' (or avoiding).

A THIRD METHOD OF AVOIDING DISSONANCE

There is yet a third method of managing Dissonants. That is to see if by raising the staying pitch of the Dissonant swara, you cannot create a new note which will not be dissonant. Now taking the dissonant set Ri and Ga, we have to decide which of the two notes, Ri and Ga, we may take for raising the pitch. If the pitch of 'Ri is raised, the note Ga which is already thin with only two śrutis will become thinner still. So, the more convenient choice will be to take Ga for our purpose. If we raise the staying pitch of Ga, it will be nearer to Ma. This new swara is called 'Antara' swara or the 'intervening one'. Its staying pitch is the 11th śruti, that is, slightly lower than the 'E' of the Diatonic scale which corresponds to the 'Suddh' Gāndhara of the Hindustani system. Similarly, in the other set of dissonant notes Dha and Ni, the staying pitch of Ni is raised to the 2nd śruti of Sa. This new swara is called 'Kākali' or 'somewhat indistinctly sweet'.

In the Madhayama Grāma, the madhyama is naturally more important and the swara by its side, namely Ga has more often to be dealt with than the other disturbing swara Ni. So, we can naturally

expect the 'Antara swara', or the 'Antara Gāndhāra' as it is usually called, figuring more often in Madhyama grāma; and for a similar reason, the 'Kākali swara' figures more often in the Shadja grāma. When Grāmas came to be mixed, both these new swaras have been indifferently used in both the grāmas. We therefore get the addition of a Madhyama grāma with a 'Kākali' and a Shadja grāma with an 'antara' in the first instance and later on, both these grāmas with one or both of these two new swaras. The fourteen moorchhanas of the two grāmas thus become four-told, namely, the pure variety, the variety with antara, the variety with Kākali, and the variety with both antara and Kākali. This is the limit of the purely scientific development of notes natural and artificial. These ten notes, namely, the seven natural notes that are found in the Shadja grāma, the Panchama (with the lower śruti) of the madhyama grāma, the antara, and the Kākali form the basis of the 'Mārga' or the perfect form of music. The further addition of artificial swaras is the result of the necessity to subserve local or other tastes in the Dēśi or the provincial approximation to the perfect pattern (Vide Nātya Śāsta, Chapter 28, Slokas 33 to 35 and the introductory and intervening prose passages).

OTHER FEATURES OF JĀTIS

To continue the further details of Shādji Jāti and its modified forms. Of the swaras that determine the form of a rāga, Nyāsa is of course the most important. And for the Shādji Jāti the Nyāsa which

is unchangeable is Shadja. The Amśa swaras can be Sa, Ga, Ma, Pa, or Dha. It will be seen that in the two pairs of dissonant notes, namely, Ri Ga and Dha Ni, we have excluded Ri and Ni for the Amsas of Shādji Jāti. We have given up Ri in the first pair and adopted Ga, and given up Ni in the 2nd pair and adopted Dha. The reason for this discriminative has to be found out. The Moorchhana of the Shādji Jati begins in 'Dha'. It is therefore improper not to allow 'Dha' an important place in it. This is therefore included among the Amśas. Having adopted Dha, its dissonant Ni naturally goes to oblivion. In the pair Ri Ga, Ri (7th Śruti) has an additional samvadi in 'Pa' (16th śruti) of the madhyama grāma. It is therefore more appropriate that Ri is included among the Amśas of Jatis born from Madhyama grāma, unless it is absolutely necessary to give it importance by virtue of its position as Nyāsa etc. We therefore conveniently omit the note 'Ri' from the Amśas of Shādji Jāti and adopt Ga.

THE MODIFICATIONS OF SHĀDJI JĀTI

We have thus five ways of developing Shādji Jati, each with a different Amśa. Of these five, that variety which has both Nyāsa and Amśa the same, namely 'Sa', is called the Śuddha Jāti or pure Jāti and the other varieties are called Vikrita Jātis or modified Jātis. The pure Jāti also requires that all the seven swaras are employed in its developement. But it is possible to develope Rāgas with 5 or 6 swaras in their composition. We get therefore another set of Vikrita Jatis by the employment of 5 or 6 swaras instead of 7.

In Shādji Jati, however it has been ruled that it is not possible to have a modification with 5 swaras only. The reason has yet to be discovered. We are therefore left with Vikrita Jātis with six notes only.

GRAHA AND APANYĀSA SWARAS

There are two other important swaras in Rāga formation. The first is the note at which you start before you stay in the Amśa or Vādi. It may so happen in many cases that you straightaway begin the Rāga by dwelling at the main swara, namely, the Amśa. But there are also Rāgas in which you may take a start, so to say, from some other swara and proceed to the main swara and stay there. The starting swara is called the Graha swara. It may be either the same as Amśa swara or the Nyasa swara or different from both. The Śuddha or pure J[illegible] requires that not only the Āmśa swara but also [illegible] Graha swara must be the same as Nyāsa swara.

The next important note in Rāga formation [illegible] the note or notes which you can choose as sub-centre[illegible] of expansion of the Rāga. These notes are called Apanyāsa swaras. They are generally the samvadis of the Nyasa, Amśa or Graha ; but in some cases the nearer anuvādis are also employed for that purpose. Now, for the Shadji Jāti, the Apanyasa swaras that are employed are Ga and Pa. The Jati in its pure form, however, does not admit of other swaras as 'apanyasas' or sub-centres of expansion. The employment of Ga and Pa as 'apanyāsas' will thus give us further 'Vikrita Jatis'.

THE TOTAL No. OF VIKRITA JĀTIS IN SHĀDJI AND OTHER JĀTIS

We are now in a position to find the total number of Vikrita or modified forms of Shādji. Jātis will remain pure if

(1) Amśa is the same as Nyāsa
(2) Graha ,, ,, ,,
(3) Apanyāsa ,, ,, ,,
and (4) all the 7 swaras are employed.

We can conceive of cases where all the 4 conditions are not fulfilled or cases where three, two or one only of these conditions are not fulfilled. In all these cases we shall get Vikrita Jātis.

In the first of these 4 possible cases, that is, when l the 4 conditions are not fulfilled, we get one krita. In the second, we can have 4 Vikritas as ee conditions out of four can occur four times (abc, d, acd, bcd are the possible cases where a, b, c and represent the unfulfilled conditions). In the third ase, -we can have 6 Vikritas (ab, ac, ad, bc, bd, cd). In the last case we can have 4 Vikritas (a, b, c, d). The total number of Vikrita Jātis is therefore $1 + 4 + 6 + 4 = 15$.

It will be noticed that among these 15 Vikritas, if we count those Vikritas where a particular condition a or b or c or d is broken, we find there are eight Vikritas. We can therefore have 8 Vikrita Jatis in which all the seven swaras are not emloyed. In such cases we can employ 6 swaras or 5 swaras. This doubles the 8 Vikrita Jatis wanting all the 7 swaras.

So, we get 15 + 8 = 23 Vikrita Jatis wherever both 5 swaras and 6 swaras are allowed to be employed. In Shādji however, formation of Vikrita with 5 swaras is prohibited. In the other six Jatis, that is allowed.

In the other Jatis therefore we can have 23 Vikrita Jātis. The total number of Vikrita Jatis is therefore 15 + (6 × 23) = 15 + 138 = 153. We thus see that the modifications of the 7 pure Jātis give us 153 Vikritas. But the Mārga system of music as described in the Indian texts is not satisfied with these 153 variations. It has recognised combinations of one or more of these Vikrita Jatis to form what are called 'Sankīrna (mixed) Jatis'. Of these Sankirna Jatis, eleven have been recognised as equal in status to the seven pure Jātis. The Jātis with distinctive features fully described are therefore 18, seven Śuddha (pure) and 11 Sankīrna (mixed).

CHAPTER XIII

RAGAS AND THEIR DEVELOPMENT.

We are now in a position to sum up the principles of Raga-formation. For, what are Rāgas but Vikrita Jātis christened with new names ?

A Rāga has its resting place in the Nyāsa Swara, gets its emotional colour from the Amśa swara or Vādi, starts from the Grahaswara and uses the Apanyāsa swaras as sub-centres for its development. The moorchhana or the closed curve of seven swaras determine the turning points in the design and it is

the Nyâsa and Moorchhana that lend the family trait to the Rāgas. The Nyāsa determines the moorchhana, controls the selection of the Amśas and Apanyāsas and prescribes the swaras that could possibly be omitted for forming Rāgas with six swaras (Shāḍava Ragas) and Ragas with five swaras (Ouḍava Rāgas). That is why the family is called by the name of the Nyâsa.

The several branches of a family classified into full-blood and half-blood correspond to the Śuddha and Vikrita forms of a Jāti. The Śuddha form does not swerve from the Nyâsa or the note giving the highest pleasure, and is loath to choose other swaras as Amsas, Grahas, and Apanyāsas.

SUDDHA JĀTIS AND HOW THEY ARE SUNG

The first step in developing the Jāti has already been indicated when we considered how the Nyāsa determines the moorchhana. We shall now deal with the full expansion of the Śuddha Jātis.

The Jāti is started from the Graha swara which is the same as the Nyāsa swara in Śuddha Jāti. We therefore start by dwelling well and long enough at the Nyāsa swara and gradually extend the swara-curve by adding, one by one, the upper swaras, enjoying each extended curve and finishing at the Nyāsa. A free use of the swaras lower than the Nyāsa according to the pleasure of the singer, is always allowed in practice. The singing is begun in the middle octave or madhya sthāyee. The gradual expansion of the curve by the addition of the upper

notes one by one is continued till the samvādi or the consonant of the Nyāsa is reached, which will generally be the end of the Moorchhana of the Jāti. The musical curve now assumes a form with the Nyāsa and its samvādi as its resting points, and the intervening swaras along with the swaras below the Nyāsa forming the path of the sanchāra. The lower reach is the Nyāsa in the lower octave.

The next step is to add one by one the swaras higher than the samvādi of the Nyâsa till the Nyāsa in the higher octave is reached. In the Śuddha Jāti, the Nyāsa in the higher octave is not allowed the important place of the Nyâsa. But nevertheless, being the upper Amśa (Amśa swara being the same as the Nyāsa in Suddha Jāti), it has got the importance of the chief swara dominating the emotional quality of the Rāga.

A fresh start can therefore be made from this upper swara, and the ascent continued till its samvādi is reached which will generally be the end of the moorchhana in the upper octave. This is the development of the Raga upwards. Then begins the development of the Rāga downwards. Starting from the upper Amśa, the curve gradually enlarges by adding to itself the lower swaras one by one. In progressing downwards, we must not forget the end-swara of the moorchhana where a stay is compulsory. A fresh start is made at the next swara and proceeded till the Nyāsa (which is also the Amśa) at which the raga started, is reached. A further descent with the Nyâsa as its starting point is made till the lower Nyāsa is reached, *at each stāge returning to the central Nyāsa.*

This general plan holds good for all ragas whether it is a Śuddha Jāti Rāga or a Vikrita Jāti Rāga, the only difference being that the Amśa and Apanyāsa may be different from the Nyāsa in Vikrita Jātis. This difference clothes the Amśa with an importance all its our. The Amśa thus becomes the chief centre for staying at every stāge of the development the Raga, although the final resting place of each musical paragraph is the Nyāsa swara.

The development of Ragas on the lines just described, is usually supplemented by further steps in the case of Rāgas in which the Amśa, and Apanyasas are usually different from the Nyāṣa. The second step is confined to the development of the Rāga with the Apanyāsas as sub-centres. It is followed by a third step in which the whole moorchhana of the Rāga with all its life is dwelt on in a series of single efforts with upper and lower additions up to the samvādis of the Amśas, Nyāsa, or the end-swaras of the moorchhanas.

CHAPTER XIV

THE HISTORY OF MUSIC

Secular music in its elaborate form is found to have been derived from religious music in all countries. The same is the case in our country where secular music is expressly stated to have been fashioned out of the music of Sāma Vēda, one of the oldest song-books of the world, if not the oldest. In the Sāman chant each verse of the RgVēda has been expanded into a song or a series of two or three songs with the same words but different syllabification or ornamentation and music.

The idea of Grāma and Moorchhana have already been recognised by text-writers on the technique of Sāma Veda, like Nārada. Each musical piece is composed of a number of phrases each having 'a completeness by itself' and a 'musical consonance' with the preceding and following phrases. These two features of the phrases strike us with wonder, but the exact method of their manipulation has yet to be analysed and understood. When analysed it is sure to reveal many hidden secrets of music for which we are still groping.

NOTES OF SĀMA VĒDA

The Sāma Veda is said to be constructed with the help of seven notes. They are equated in the Śikṣa of Narada with Ma Ga Ri Sa Ni Dha and Pa. But when the Sāma Vēda is chanted, we are not reminded of any secular rāga. The identification of the notes of the Sāma Vēda with particular notes, naturals sharps or flats, of secular music has given rise to an amusing number of conjectures. The most plausible one is to equate them to the notes beginning from Ga of 'Kharaharapriyā' of the South which is the same thing as 'Kāfi' of the North. But it is also plain that neither of the two ragas are brought to our mind when we hear the Sāman chant.

It appears extremely probable that the notes of the Sāma Vēda are all *Prakriti Swaras but with the Śrutis constituting each swara arranged in a descending order so that the lowest sruti of each note become the dominant sruti of that note.* Considered

in this light, it will be found, if we take into account the composition of Prakriti Swaras, that the lowest sruti of each swara is the highest one or very nearly that, of each of the notes of 'Kharaharapriya' or 'Kāfi'.

The Vedic chant appears therefore to have been modified in the secular music with the srutis in the ascending order instead of the descending one.

HISTORY OF RAGAS

The Jātis are said to have been conceived with the technique of the Sāma Vēda. The Vikrita Jātis have given rise to rāgas. These ragas and their subsequent modifications to suit provincial and social taste, and the necessities of the intonations of several languages, have been classified into the 'Mārga' or the purely scientific and the 'Dēśi' or provincial. In between them we have a third variety called Bhāsha ragas which is included in the one or the other as it suits particular authorities.

Fifty eight Ragas of the purely scientific or Mārga Variety and 120 Ragas of the Bhāsha Variety are detailed in the most comprehensive treatise of Indian music namely the 'Sangita Ratnakara' of the twelfth century. The same text-book mentions a number of Dēśi rāgas or later modifications of Mārga and Bhāsha Ragas. But the enumeration and description of the last class is necessarily not exhaustive as the local modifications must have multiplied by hundreds. The number actually given in the book by way of sample is eighty-six.

THE PRESENT DAY RAGAS OF INDIA

The dark age that succeeded the 12th century and the later history of music has already been stated, and we have now the two broad divisions of Indian music namely the Hindustani and Carnatic system.

The number of Ragas now in use in North India is more than two-hundred and in South India about three hundred. But the ragas rich in melodic quality and emotional appeal are within a hundred both in the North and in the South and what is more important to remember, these Ragas are preserved more by traditional practice than with the help of the Science of Music whose study went out of use some centuries ago. This is the history of Music in India.

MUSIC IN OTHER COUNTRIES

The history of music in other countries reveals that the seven moorchhanas or modes have been the foundation of almost all the systems and the principle of the Amśa or the Dominant note be-speaking a particular emotion has been paid its due attention. Dryden's famous poem on the Alexander's feast is a fine account of the emotional power of music. This clearness and power of emotional appeal has continued till we come to the seventeenth and eighteenth centuries. Thereafter the band-music became more important in several countries, and musical effects easily produced by the voice have been attempted with instruments by a combination of notes. The Sthāyi Swara Alankaras have given rise to the chords of European Music. The individuality of emotional appeal has gradually become blurred when heard through the inarticulate

expression of instruments, and variety and richness have been secured at the cost of clearness of emotion. The dominant note of the piece (Amśa Swara) gave its place of importance to the Scale or the shape of the musical curve. The same curve was repeated with the help of the Samvadies of each note, in other words by shifting each note by an interval of sub-dominant. The effect of this second curve is to produce a 'similar' emotional appeal to that of the primary curve as all the notes are the consonants of those of the first. But the 'same' emotion has given place to 'similar' emotion. Further curves in the higher octaves which are easily possible in instruments, added to the richness of western music though at the cost of clearness and sureness of emotional appeal. This is the history of Music in foreign countries.

We thus find that the fundamental basis of music is the same in all countries and that 'Samvadi' or 'consonant note' and 'moorchhana' or the melodic curve form that basis. An attempt has been made in the previous pages to present to the modern student the clear description of the fundamental concepts of music in our ancient texts. It will be found that these concepts have a universal application and both the east and west stand to gain by a clear understanding of the concepts.

THE END